

IN THE CLAIMS

The following claim set replaces all prior versions, and listings, of claims in the application:

1-20 (Cancelled)

21. (Four Times Amended) A method of treating chemical cellulose pulp from an alkaline pulping process, after cooking and preferably after oxygen delignification, with chlorine dioxide in a first chlorine dioxide stage of an elemental chlorine free bleaching sequence, and of minimizing the use of chlorine dioxide, comprising the sequential steps of:

- (a) bleaching the chemical cellulose pulp in a first chlorine dioxide step at a temperature between 80-1000C for less than 10 minutes and so as to provide a chlorine dioxide dosage of between 0.5-1.5 % active chlorine, and adjusting the pH of the pulp in the first chlorine dioxide step so that the final pH of the step is over 4; and then
- (b) effecting an acid treatment of the chemical cellulose pulp from step (a) at a pH of between 2 – 5 and at a temperature of over 80°C and a time of 30-300 minutes sufficient to remove hexenuronic acids from the pulp, and
- (c) bleaching the chemical cellulose pulp in a second chlorine dioxide step, and wherein
steps (a) – (c) are practiced without between step washing.

22. (Previously Submitted) A method as recited in claim 21 wherein (a) is practiced so that the final pH of the first chlorine dioxide step is over 5, and so that hexenuronic acid groups in the pulp substantially do not react with chlorine dioxide.

23. (Previously Submitted) A method as recited in claim 22 wherein (a) is further practiced so that the temperature in the first chlorine dioxide step is over 75°C.

24. (Previously Submitted) A method as recited in claim 22 wherein (a) is further practiced so that the temperature in the first chlorine dioxide step is between about 80 - 100°C.

25. (Previously Submitted) A method as recited in claim 24 wherein (a) is further practiced so that the treatment time in the first chlorine dioxide step is between 30 seconds - 3 minutes.

26. (Cancelled)

27. (Presently Amended) A method as recited in claim 26 21 wherein (a)-(c) are practiced so that the treatment temperatures in the first chlorine dioxide step, the acid treating step, and the second chlorine dioxide step, are substantially the same.

28. (Presently Amended) A method as recited in claim 26 21 wherein (c) is practiced so as to provide a chlorine dioxide dosage of between about 0.5-2.0% active chlorine during the practice of the second chlorine dioxide step.

29. (Previously Submitted) A method as recited in claim 21 further comprising (c) treating the chemical cellulose pulp with chelating agent after (a) and (b).

30. (Previously Submitted) A method as recited in claim 21 wherein (a) is further practiced so that the temperature in the first chlorine dioxide step is over 75°C.

31. (Previously Submitted) A method as recited in claim 21 wherein (a) is further practiced so that the temperature in the first chlorine dioxide step is between about 80 - 100°C.

32. (Previously Submitted) A method as recited in claim 21 wherein (a) is further practiced so that the treatment time in the first chlorine dioxide step is between 30 seconds - 3 minutes, and at a chlorine dioxide dosage of about 0.1-1.0% active chlorine..

33. (Previously Submitted) A method as recited in claim 21 wherein step (b) is practiced at a pH between 2.5-4, a temperature between 90-110°C, and a time between 30-300 minutes.

34. (Presently Amended) A method as recited in claim 26 21 wherein (a) through (c) are practiced utilizing an acid tower, an inlet line to the acid tower, and an outlet line from the acid tower to a further treatment device; and wherein (a) is practiced substantially completely within the inlet line to the acid tower, (b) is practiced substantially completely within the acid tower, and (c) is practiced substantially completely in the discharge line from the acid tower.

35. (Presently Amended) A method of treating chemical cellulose pulp from an alkaline pulping process, after cooking and preferably after oxygen delignification, with chlorine dioxide in a first chlorine dioxide stage of an elemental chlorine free bleaching sequence, and of minimizing the use of chlorine dioxide, comprising the sequential steps of:

- (a) bleaching the chemical cellulose pulp in a first chlorine dioxide step so that the final pH of the step is over 5, and so as to provide a chlorine dioxide dosage of between about 0.5-1.5 % active chlorine and so that hexenuronic acid groups in the pulp substantially do not react with chlorine dioxide, and for a treatment time of between 30 seconds-three minutes and at a temperature of 80-1000C; and then
- (b) acid treating the chemical cellulose pulp from step (a) at a pH of between 2 - 5 and at a temperature of over 80°C for 30-300 minutes, and
- (c) bleaching the chemical cellulose pulp in a second chlorine dioxide step, and wherein
steps (a) – (c) are practiced without between step washing.

36. (Cancelled)

37. (Presently Amended) A method as recited in claim 36 35 wherein (a)-(c) are practiced so that the treatment temperatures in the first chlorine dioxide step, the acid treating step, and the second chlorine dioxide step, are substantially the same.

38. (Presently Amended) A method as recited in claim 36 35 wherein (a)-(c) are practiced so that the treatment temperatures in the first chlorine dioxide step, the acid treating step, and the second chlorine dioxide step, are substantially the same, and between about 90-100°C.

39. (Presently Amended) A method of treating chemical cellulose pulp from an alkaline pulping process, after cooking and preferably after oxygen delignification, with chlorine dioxide in a first chlorine dioxide stage of an elemental chlorine free bleaching sequence, comprising the sequential steps of:

- (a) bleaching the chemical cellulose pulp in a first chlorine dioxide step at a temperature of between 80-100°C and for less than 10 minutes, and adjusting the pH of the pulp in the first chlorine dioxide step so that the final pH of the step is over 4, then
- (b) acid treating the chemical cellulose pulp from step (a) at a pH of between 2 – 5 and at a temperature of over 80°C for 30-300 minutes, and
- (c) after (b) bleaching the chemical cellulose pulp in a second chlorine dioxide step; and

wherein (a) is further practiced so as to provide a chlorine dioxide dosage of between about 0.1-1.0% active chlorine during the first chlorine dioxide step; and wherein (c) is practiced so as to provide a chlorine dioxide dosage of between about 0.5-2.0% active chlorine during the practice of the second chlorine dioxide step, and wherein steps (a) – (c) are practiced without between step washing.

40. (Previously Submitted) A method as recited in claim 39 wherein (a) is further practiced so that the temperature in the first chlorine dioxide step is between about 80-100°C, and so that the treatment time in the first chlorine dioxide step is between 30 seconds – three minutes.

41. (Previously Submitted) a method as in claim 39, wherein step (c) is practiced for less than 10 minutes.